No. 200400017

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Monsanto Technology LLC

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC [illegible] MAINTENANCE OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE [illegible] TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR [illegible]ING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE [illegible]RPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT [illegible] THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN, FIELD

'I180421'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirtieth day of January, in the year two thousand and eight.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary [illegible]

BUREAU OF ENGRAVING AND PRINTING

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
Monsanto Technology L.L.C.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
None

3. VARIETY NAME
I180421

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
3100 Sycamore Road
DeKalb, IL 60115
U.S.A.

5. TELEPHONE *(Include area code)*
(815) 758-9281

6. FAX *(Include area code)*
(815) 758-4106

FOR OFFICIAL USE ONLY

PVPO NUMBER
20040017

FILING DATE
Oct. 20, 2003

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Corporation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION
Delaware

9. DATE OF INCORPORATION
August 27, 1999

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*

Dr. Tim Kain, Patent Scientist
Monsanto Company
8350 Minnegan Road
Waterman IL 60556

Michael J. Roth
800 N. Lindbergh Blvd.
St. Louis, MO

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 3652.00
DATE 10/20/03

CERTIFICATION FEE:
$ 768.00
DATE 11/21/07

JMS 8/18/05

11. TELEPHONE *(Include area code)*
(815) 758-9281

12. FAX *(Include area code)*
Fax 815-758-3117

13. E-MAIL
trkain@monsanto.com

14. CROP KIND *(Common Name)*
Corn, Field

15. GENUS AND SPECIES NAME OF CROP
Zea mays

16. FAMILY NAME *(Botanical)*
Graminae

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☒ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of Variety
d. ☐ Exhibit D. Additional Description of the Variety *(Optional)*
e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☒ Filing and Examination Fee ($3,652), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☐ YES *(If "yes", answer items 20 and 21 below)* ☒ NO *(If "no", go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☐ YES ☐ NO
IF YES, WHICH CLASSES? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☐ NO
IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS.
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☒ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER	SIGNATURE OF OWNER
Timothy R. Kain	
NAME *(Please print or type)*	NAME *(Please print or type)*
Timothy R. Kain	
CAPACITY OR TITLE: Patent Scientist	DATE: 10/17/03
CAPACITY OR TITLE	DATE

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INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $3,652 ($432 filing fee and $3,220 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvp.htm

ITEM

18a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

21. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

22. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

Parent of a hybrid sold in the U.S. – March 2003

23. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. http://www.ams.usda.gov/lsg/seed.htm

ST-470 (02-10-2003) designed by the Plant Variety Protection Office with Word 2000. Replaces former versions of ST-470, which are obsolete.

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EXHIBIT A
(Revised)

Origin and Breeding History
I180421

Corn Variety I180421 was selected for high general combining ability, rapid drydown, short plant ststure, improved root strength and increased female seed production yield.

Winter 1994-95	The inbred line 3DHD3* (a proprietary Monsanto inbred) was crossed to the inbred line 81BRQ3** (a proprietary Monsanto inbred) in nursery rows Elite row 30 and Elite row 63 in Maui.
Summer 1995	The S0 seed was grown and self-pollinated in nursery row 221-52 in Olivia MN.
Summer 1996	The S1 seed was grown and self- pollinated in nursery rows 21:43 thru 82 at Olivia MN. 65 ears were selected to advance to the S2.
Summer 1997	S2 ears were grown ear-to-row and self pollinated. 3 ears were selected from nursery row 175-76 Olivia MN. to advance.
Winter 1997-98	S3 ears were grown ear-to-row and self-pollinated. 3 ears were selected from nursery row Mexico 91MX5-122 to advance.
Summer 1998	S4 ears were grown ear-to-row and self-pollinated. 3 ears were selected in nursery row 204-2 Olivia MN.
Winter 1998-99	S5 ear were grown ear-to-row and self-pollinated. 3 ears from Mexico nursery row 914SF-693 were selected to advance.
Summer 1999	S6 ears were grown ear-to-row and self-pollinated. 3 ears from nursery row 226-39 Olivia MN were selected to advance.
Winter 1999-00	S7 ears were grown ear-to-row and self-pollinated. Ears from rows 91SS-7141 were advanced as named variety **I180421**.
Summer 2000	I180421 was bulked from final selection out of nursery rows 514:1-7 and 515:1-13 Olivia MN.

* - Inbred line 3DHD3 is derived from FBLL (PVP No. 9100034)
** - Inbred line 81BRQ3 is derived from B37

Statement of Stability and Uniformity

Corn Variety I180421 was coded in 1999 with final selection made in 2000. This variety has been reproduced by self pollination for three generations and judged to be stable. Corn Variety I180421 is uniform for all traits observed.

Statement of Variants

Corn Variety I180421 shows no variants other than what would normally be expected due to environment or that would occur for almost any character during the course of repeated sexual reproduction.

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EXHIBIT B
(Revised)

Statement of Distinctness

Monsanto Technology L.L.C. believes that Corn Variety I180421 is most similar to Corn Variety 3DHD3, an inbred developed by DEKALB Genetics Corporation. An Exhibit C is submitted to provide an objective description of the comparative variety, 3DHD3.

Corn Variety I180421 and 3DHD3 differ most significantly in the following traits:

Trait	I180421	3DHD3
Silk Color	Yellow (2.5 Y 8/10)	Pink (5 R 6/6)

Leaf Length (cm)	Year	Mean	Std. Dev.	Sample Size	t-Test results
I180421	1999	61.7	3.78	10	t = -11.0
3DHD3	1999	73.6	2.06	10	

Leaf Length (cm)	Year	Mean	Std. Dev.	Sample Size	t-Test results
I180421	2000	63.0	2.65	10	t= -11.3
3DHD3	2000	73.1	1.55	10	

Leaf Length (cm)	Year	Mean	Std. Dev.	Sample Size	t-Test results
I180421	2001	62.4	2.41	10	t = -9.93
3DHD3	2001	72.6	1.39	10	

Ear Shank Length (cm)	Year	Mean	Std. Dev.	Sample Size	t-Test results
I180421	1999	6.9	0.34	10	t = -33.6
3DHD3	1999	16.5	0.81	10	

Ear Shank Length (cm)	Year	Mean	Std. Dev.	Sample Size	t-Test results
I180421	2000	6.9	0.54	10	t = -26.9
3DHD3	2000	16.5	1.01	10	

Ear Shank Length (cm)	Year	Mean	Std. Dev.	Sample Size	t-Test results
I180421	2001	7.3	0.43	10	t = -21.2
3DHD3	2001	16.2	1.29	10	

EXHIBIT B (cont'd)
(Revised)

Corn Variety I180421 has yellow silk while corn variety 3DHD3 has pink silk. Also corn variety I180421has a significantly shorter leaf length and ear shank length than variety 3DHD3.

FORM SD-470-28
(9-1-92)

EXHIBIT C
(Corn; Maize)

United States Department of Agriculture, Agricultural Marketing Service
Science Division, Plant Variety Protection Office
National Agricultural Library Building, Room 500
Beltsville, MD 20705

OBJECTIVE DESCRIPTION OF VARIETY
CORN (*Zea mays* L.)

Name of Applicant(s)	Variety Seed Source	Variety Name or Temporary Designation
Monsanto Technology L.L.C.		I180421

Address (Street & No., or R.F.D. No., City, State, Zip Code and Country)	FOR OFFICIAL USE
3100 Sycamore Road, DeKalb, IL 60115 U.S.A.	PVPO Number 200400017

Place the appropriate number that describes the varietal characters typical of this inbred variety in the spaces below. Right justify whole numbers by adding leading zeroes if necessary. Completeness should be striven for to establish an adequate variety description. Traits designated by a '*' are considered necessary for an adequate variety description and must be completed.

COLOR CHOICES (Use in conjunction with Munsell color code to describe all color choices; describe #25 and #26 in Comments section):

01=Light Green	06=Pale Yellow	11=Pink	16=Pale Purple	21=Buff
02=Medium Green	07=Yellow	12=Light Red	17=Purple	22=Tan
03=Dark Green	08=Yellow-Orange	13=Cherry Red	18=Colorless	23=Brown
04=Very Dark Green	09=Salmon	14=Red	19=White	24=Bronze
05=Green-Yellow	10=Pink-Orange	15=Red & White	20=White Capped	25=Variegated (Describe)
				26=Other (Describe)

STANDARD INBRED CHOICES (Use the **most similar** (in background and maturity) of these to make comparisons based on **grow-out trial data**):

Yellow Dent Families: Family	Members	Yellow Dent (Unrelated):	Sweet Corn:
		Co109, ND246,	C13, Iowa5125, P39, 2132
B14	CM105, A632, B64, B68	Oh7, T232	
B37	B37, B76, H84	W117, W153R	Popcorn:
B73	N192, A679, B73, NC268	W182BN	SG1533, 4722, HP301, HP7211
C103	Mo17, Va102, Va35, A682		
Oh43	A619, MS71, H99, Va26	White Dent:	Pipecorn:
WF9	W64A, A554, A654, Pa91	CI66, H105, Ky228	Mo15W, Mo16W, Mo24W

1. TYPE: (describe intermediate types in Comments section)

* 2 1=Sweet 2=Dent 3=Flint 4=Flour 5=Pop 6=Ornamental 7=Pipecorn

Standard Inbred Name B73
2

2. REGION WHERE DEVELOPED IN THE U.S.A.:

* 2 1=Northwest 2=Northcentral 3=Northeast 4=Southeast 5=Southcentral 6=Southwest 7=Other _____

Standard Seed Source NCRIPS_
2

3. MATURITY (In Region Best Adaptability; show Heat Unit formula in "Comments" section):

	DAYS	HEAT UNITS		DAYS	HEAT UNITS
*	0 7 2	1 4 4 9.8	From emergence to 50% of plants in silk	0 8 0	1 6 0 8.5
*	0 7 3	1 4 5 1.5	From emergence to 50% of plants in pollen	0 7 8	1 5 5 5.0
	_ _ _	_ _ _ _._	From 10% to 90% pollen shed		
(*)	_ _ _	_ _ _ _._	From 50% silk to optimum edible quality	_ _ _	_ _ _ _._
	_ _ _	_ _ _ _._	From 50% silk to harvest at 25% moisture	_ _ _	_ _ _ _._
				_ _ _	_ _ _ _._

4. PLANT:	Standard Deviation	Sample Size	Standard Deviation	Sample Size
* 1 6 3.1 cm Plant Height (to tassel tip)	12.5	30	2 0 2.4 7.2	30
* 0 5 5.8 cm Ear Height (to base of top ear node)	6.4	30	0 6 4.7 2.3	30
0 1 1.7 cm Length of Top Ear Internode	2.4	30	0 1 5.1 0.4	30
Average Number of Tillers				
* 1.0 Average Number of Ears per Stalk	0.0	30	0 0 1.0 0.0	30
3 Anthocyanin of Brace Roots: 1=Absent 2=Faint 3=Moderate 4=Dark			4	

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Application Variety Data	Page 2		Standard Inbred Data		
5. LEAF:	Standard Deviation	Sample Size		Standard Deviation	Sample Size
* 0 0 9. 9 cm Width of Ear Node Leaf	0.7	30	0 0 7. 1	0.1	30
* 0 6 2. 4 cm Length of Ear Node Leaf	2.8	30	0 7 1. 6	1.1	30
* 6. 5 Number of leaves above top ear	0.1	30	5. 4	0.3	15
3 4. 2 degrees Leaf Angle (measure from 2nd leaf above ear at anthesis to stalk above leaf)	3.8	30	2 4. 3	1.1	30
* 0 2 Leaf Color (Munsell code 5 GY 5/8)			0 3 (Munsell code 5 GY 3/4)		
4 Leaf Sheath Pubescence (Rate on scale from 1=none to 9=peach fuzz)			5		
4 Marginal Waves (Rate on scale from 1=none to 9=many)			6		
4 Longitudinal Creases (Rate on scale from 1=none to 9=many)			5		
6. TASSEL:	Standard Deviation	Sample Size		Standard Deviation	Sample Size
* 4. 3 Number of Primary Lateral Branches	0.4	30	6. 0	1.0	30
1 9. 5 Branch Angle from Central Spike	9.7	30	2 8. 0	0.7	30
* 3 3. 4 cm Tassel Length (from top leaf collar to tassel tip)	1.7	30	4 4. 9	0.1	30
5. 1 Pollen Shed (Rate on scale from 0=male sterile to 9=heavy shed)			6. 8		
1 1 Anther Color (Munsell code 2.5 R 7/6)			2 2 (Munsell code 10 Y 8.5/6)		
0 2 Glume Color (Munsell code 5 GY 4/8			0 2 (Munsell code 5 GY 4/8)		
1 Bar Glumes (Glume Bands): 1=Absent 2=Present			1		
7a. EAR (Unhusked Data):					
* 0 7 Silk Color (3 days after emergence) (Munsell code 2.5 Y 8/10)			0 5 (Munsell code 2.5 GY 8/6)		
0 2 Fresh Husk Color (25 days after 50% silking) (Munsell code 5 GY 4/8)			0 2 (Munsell code 5 GY 4/8)		
2 1 Dry Husk Color (65 days after 50% Silking) (Munsell code 2.5 Y 8/4)			2 1 (Munsell code 2.5 Y 8/4)		
* 1 Position of Ear at Dry Husk Stage: 1=Upright 2=Horizontal 3=Pendent			3		
6 Husk Tightness (Rate on scale from 1=very loose to 9=very tight)			6		
1 Husk Extension (at harvest): 1=Short (ears exposed) 2=Medium (<8 cm) 3=Long (8-10 cm beyond ear tip) 4=Very Long (>10 cm)			3		
7b. EAR (Husked Ear Data):	Standard Deviation	Sample Size		Standard Deviation	Sample Size
* 1 4. 9 cm Ear Length	3.8	30	1 3. 1	0.4	30
* 3 8. 0 mm Ear Diameter at mid-point	2.0	30	4 2. 7	0.8	30
1 0 1. 4 gm Ear Weight	5.6	10	1 2 8. 7	6.5	10
* 1 3 Number of Kernel Rows	0.6	30	1 6. 4	0.7	30
2 Kernel Rows: 1=Indistinct 2=Distinct			2		
1 Row Alignment: 1=Straight 2=Slightly Curved 3=Spiral			2		
0 7. 0 cm Shank Length	0.5	30	0 8. 1	0.7	30
2 Ear Taper: 1=Slight 2=Average 3=Extreme			2		

Application Variety Data	Standard Inbred Data
Note: Use chart on first page to choose color codes for color traits.	

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Application Variety Data	Page 3		Standard Inbred Data		
8. KERNEL (Dried):	Standard Deviation	Sample Size		Standard Deviation	Sample Size
1 0. 7 mm Kernel Length	0.4	30	1 0. 7	0.4	15
0 7. 8 mm Kernel Width	0.7	30	0 6. 8	0.2	15
0 4. 2 mm Kernel Thickness	0.2	30	0 3. 6	0.3	15
4 1. 6 % Round Kernels (Shape Grade)	4.4	500g	3 8. 7	6.4	500g
1 Aleurone Color Pattern: 1=Homozygous 2=Segregating			1		
(*) 1 9 Aleurone Color (Munsell code Lighter than 2.5 Y 9/2)			1 9 (Munsell code Lighter Than 2.5 Y 9/2)		
* 0 7 Hard Endosperm Color (Munsell code 2.5 Y 8/10)			0 7 (Munsell code 2.5 Y 8/10)		
* 0 3 Endosperm Type: 1=Sweet (su1) 2=Extra Sweet (sh2) 3=Normal Starch 4=High Amylose Starch 5=Waxy Starch 6=High Protein 7=High Lysine 8=Super Sweet (se) 9=High Oil 10=Other			0 3		
2 2. 5 gm Weight per 100 Kernels (unsized sample)	0.5	2000 seeds	2 3. 1	0.6	2000 seeds
9. COB:	Standard Deviation	Sample Size		Standard Deviation	Sample Size
* 2 2. 0 mm Cob Diameter at mid-point	1.0	30	2 4. 9	0.9	30
1 1 Cob Color (Munsell code 5 R 6/6)			1 4 (Munsell code 5 R 3/8)		

10. DISEASE RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); leave blank if not tested; leave Race or Strain Options blank if polygenic):

A. Leaf Blights, Wilts, and Local Infection Diseases	
7 Anthracnose Leaf Blight (*Colletotrichum graminicola*)	7
_ Common Rust (*Puccinia sorghi*)	5
_ Common Smut (*Ustilago maydis*)	_
7 Eyespot (*Kabatiella zeae*)	7
7 Goss's Wilt (*Clavibacter michiganense* spp. *nebraskense*)	7
4 Gray Leaf Spot (*Cercospora zeae-maydis*)	2
7 Helminthosporium Leaf Spot (*Bipolaris zeicola*) Race 2	8 Race 2
6 Northern Leaf Blight (*Exserohilum turcicum*) Race 2	5 Race 2
7 Southern Leaf Blight (*Bipolaris maydis*) Race 0	3 Race 0
_ Southern Rust (*Puccinia polysora*)	_
_ Stewart's Wilt (*Erwinia stewartii*)	3
_ Other (Specify) _____	_ _____
B. Systemic Diseases	
6 Corn Lethal Necrosis (MCMV and MDMV)	3
_ Head Smut (*Sphacelotheca reiliana*)	7
_ Maize Chlorotic Dwarf Virus (MCDV)	_
_ Maize Chlorotic Mottle Virus (MCMV)	_
_ Maize Dwarf Mosaic Virus (MDMV) Strain _____	_ Strain _____
_ Sorghum Downy Mildew of Corn (*Peronosclerospora sorghi*)	_
_ Other (Specify) _____	_ _____
C. Stalk Rots	
_ Anthracnose Stalk Rot (*Colletotrichum graminicola*)	_
_ Diplodia Stalk Rot (*Stenocarpella maydis*)	_
_ Fusarium Stalk Rot (*Fusarium moniliforme*)	_
_ Gibberella Stalk Rot (*Gibberella zeae*)	_
_ Other (Specify) _____	_ _____
D. Ear and Kernel Rots	
_ Aspergillus Ear and Kernel Rot (*Aspergillus flavus*)	_
_ Diplodia Ear Rot (*Stenocarpella maydis*)	_
_ Fusarium Ear and Kernel Rot (*Fusarium moniliforme*)	_
_ Gibberella Ear Rot (*Gibberella zeae*)	_
_ Other (Specify) _____	_ _____

Application Variety Data | Standard Inbred Data

Note: Use chart on first page to choose color codes for color traits.

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Application Variety Data	Page 4		Standard Inbred Data		
11. INSECT RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); leave blank if not tested):					
	Standard Deviation	Sample Size		Standard Deviation	Sample Size
_ Banks Grass Mite (*Oligonychus pratensis*)			_		
Corn Earworm (*Helicoverpa zea*)					
_ Leaf-Feeding			_		
Silk Feeding :					
_ _ _. _ mg larval wt.	_____	_____	_ _ _. _	_____	_____
_ Ear Damage			_		
_ Corn Leaf Aphid (*Rhopalosiphum maidis*)			_		
_ Corn Sap Beetle (*Carpophilus dimidiatus*)			_		
European Corn Borer (*Ostrinia nubilalis*)					
_ 1st Generation (Typically Whorl Leaf Feeding)			3		
_ 2nd Generation (Typically Leaf Sheath-Collar Feeding)			5		
Stalk Tunneling :					
_ _ _. _ cm tunneled/plant	_____	_____	_ _ _. _	_____	_____
Fall Armyworm (*Spodoptera frugiperda*)			_		
_ Leaf-Feeding			_		
Silk-Feeding :					
_ _ _. _ mg larval wt.	_____	_____	_ _ _. _	_____	_____
_ Maize Weevil (*Sitophilus zeamaize*)			_		
_ Northern Rootworm (*Diabrotica barberi*)			_		
_ Southern Rootworm (*Diabrotica undecimpunctata*)			_		
Southwestern Corn Borer (*Diatraea grandiosella*)					
_ Leaf Feeding			_		
Stalk Tunneling :					
_ _ _. _ cm tunneled/plant	_____	_____	_ _ _. _	_____	_____
_ Two-spotted Spider Mite (*Tetranychus urticae*)			_		
_ Western Rootworm (*Diabrotica virgifera virgifera*)			_		
_ Other (Specify) _____			_ _____		
12. AGRONOMIC TRAITS:					
4 Stay Green (at 65 days after anthesis) (Rate on a scale from 1=worst to 9=excellent.)			2		
0 0. 0 % Dropped Ears (at 65 days after anthesis)			0 0. 0		
0 0. 0 % Pre-anthesis Brittle Snapping			0 0. 0		
0 0. 0 % Pre-anthesis Root Lodging			0 0. 0		
0 0. 0 % Post-anthesis Root Lodging (at 65 days after anthesis)			0 3. 4		
3 7 5 6. 2 Kg/ha Yield of Inbred Per Se (at 12-13% grain moisture)			3 6 4 2. 6		

13. MOLECULAR MARKERS: (0=data unavailable; 1=data available but not supplied; 2=data supplied)

0 Isozymes 0 RFLP's 0 RAPD's

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Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S., Bul. 831. 1959.
U.S. Department of Agriculture. 1936, 1937. Yearbook.

COMMENTS (eg. state how heat units were calculated, standard inbred seed source, and/or where data was collected. Continue in Exhibit D):

Heat Unit Calculation: GDU = $\frac{\text{Daily Max Temp (<=86°F) + Daily Min Temp (>=50°F)}}{2}$ - 50°F

EXHIBIT C: Objective Description of the Variety

Following is a description of the experimental and environmental conditions by which the trials were conducted along with influences that my have contributed to the variability of the traits:

The corn varieties 'I180421', '3DHD3' and 'B73' were grown at the Waterman, IL observation nursery in years 1999-2001. The varieties were planted in 2 row plots with 15 plants per row in each of the three years. Trait data were collected on 10 random representative plants for most traits from each 2 row plot. Data on qualitative traits are usually collected on 5 plants from each 2 row plot. For Exhibit C all data were pooled and reported as means across the three years with standard deviation.

The varieties are randomly planted in a 4.5 acre observation nursery which is located within a larger 18 acre field. Besides the observation nursery, this field consists of a research seed increase nursery and an IP seed inventory nursery. The location of each of these individual nurseries is rotated each year to a different location within the 18 acre field. Therefore subject inbreds are not planted adjacent to comparative or standard varieties and may be located in different areas of the larger field each year, therefore being influenced by spacial differences within the field. Growing conditions within the field are not uniform as there are some slight topographical variations such as lower areas which may accumulate and retain water or higher areas which are usually drier. The field is tiled and therefore a variety maybe planted close to a tile line while a comparative variety maybe planted further away and in a low spot within the field. Temporal varieties can exist as weather conditions from year to year can vary as well as planting dates can vary from year to year based on weather conditions. Weather conditions each year can vary the maturity rate of the varieties due to either favorable or unfavorable growing conditions. Trait variability is not observed for each variety within its own test plot-plants are usually uniform and data are collected on the "most" representative plants- variability occurs due to spacial location of the test plot for that variety from year to year and to the temporal variation of weather conditions from year to year during the 2-3 years data are collected.

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EXHIBIT D
Additional Description of the Variety

Waterman, IL Research Station
Weather Data
1999-2001

Date	Ave. Precip. (mm)	Ave. Monthly Temp. – Max. (F°)	Ave. Monthly Temp –Min (F°)	Ave. Monthly Rel Humid.- Max(%)	Ave. Monthly Rel. Humid.- Min(%)
June 1999	5.8	78.4	58.7	-	-
July 1999	2.7	80.4	61.6	-	-
August 1999	1.2	80.0	62.3	-	-
Sept. 1999	3.6	73.7	57.3	-	-
June 2000	6.5	76.6	56.5	92.3	50.7
July 2000	3.6	80.2	60.1	93.3	56.9
August 2000	3.8	81.3	60.3	95.0	56.3
Sept. 2000	3.9	75.7	51.4	91.4	45.4
June 2001	3.2	77.2	56.5	93.2	48.8
July 2001	1.4	84.9	62.2	93.9	47.1
August 2001	2.4	82.9	61.3	96.8	55.8
Sept. 2001	4.9	71.4	48.7	95.4	50.9

Comparative data were collected on the subject variety I180421 and variety A632 in 2001.

2001

Variety	Leaf Width (cm)	Leaf Length (cm)	Leaf Angle (degrees)
I180421	9.9 Std Dev = 1.0, N= 10	58.0 Std Dev. = 2.4, N=10	37.5 Std Dev. =3.5, N=10
A632	7.4 Std Dev = 0.7, N=10	73.7 Std Dev = 4.7, N=10	51.0 Std Dev = 5.2, N=10
P_val	0.00	0.00	0.00
Sign.	**	**	**

Significance levels are indicated as: + = 10%, * = 5%, ** = 1%

Corn variety I180421 has a shorter, wider leaf with a steeper leaf angle then variety A632. Corn Variety I180421 has a pendent ear position while variety A632 has a horizontal ear position.

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Monsanto Technology L.L.C.		I180421
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)	**5. TELEPHONE** (include area code)	**6. FAX** (include area code)
3100 Sycamore Road DeKalb, IL 60115 U.S.A.	(815) 758-9281	(815) 758-4106
	7. PVPO NUMBER	200400017

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain** [X] YES [ ]

9. Is the applicant (individual or company) a U.S. National or a U.S. based company? **If no, give name of country** [X] YES [ ] NO

10. Is the applicant the original owner? [X] YES [ ] NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

[ ] YES [ ] NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

[ ] YES [ ] NO **If no, give name of country**

11. Additional explanation on ownership *(If needed, use the reverse for extra space)*:

Corn Variety I180421 was originated and developed by a breeder employed by Monsanto Technology L.L.C. By agreement between Monsanto Technology L.L.C. and the breeder, all rights to any invention, discovery, or development are assigned to Monsanto Technology L.L.C. No rights to such invention, discovery, or development are retained by the breeder.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.